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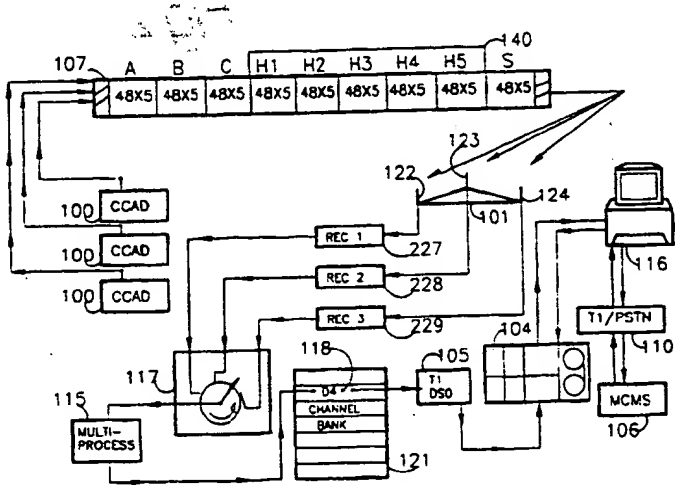

(57) Abstract

A method for use with wireless communication systems operating over cellular control channel communication bands, paging communication bands, and satellite communication bands. A transceiver transmits specialized communication protocols that contain specialized data (100) to cell-sites and mobile switching centers. The data is packaged so it does not disrupt normal voice and data traffic. The application data is scanned and recognized at the cell-site and mobile switching center and routed to central monitoring stations via the public switched telephone network. Application specific data is processed and application specific responses are read by computers (116). The central monitoring station transmits command and instruction data to an application specific transceiver that contains circuitry to receive the application specific messaging from cellular forward control channels, paging bands, and satellite bands. The transceiver responds to received commands by transmitting specialized protocols over wireless communication system control channels. Specialized control channel protocols contain global positioning coordinance data, paging acknowledgment data, security status data, motor vehicle location and status data, and other application specific data.

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Description

Wireless Communications Method Utilizing Control Channels

Technical Field

The present invention relates to communications protocols and communication systems, and more particularly to methods of wireless communication such as cellular and satellite based communications. The present invention also relates to communications apparatuses designed to transmit and receive full duplex two-way wireless radio digital data messages for data exchange, continuous electronic monitoring (CEM), and Global Positioning System (GPS) telemetry tracking.

Background Art

A variety of operation standards, methods and apparatuses have been proposed in recent years for enabling a more efficient means of providing multiple voice and data wireless transmission services. These cellular wireless operations standards are broadly known as Personal Communications Systems (PCS), Global System for Mobile (GSM), and Enhanced Specialized Mobile Radio (ESMR). Typically these cellular radio communications systems offer what is generally called value added bearer services. These services include two-way digital voice services, two-way paging, two-way point-to-point short messaging, broadcast messages, voice mail, single number access, cell broadcast point to omni-point services, electronic mail, and others. Other services proposed include motor vehicle fleet management, motor vehicle anti-theft, and other topographical coordinance systems that provide data location services. Currently these services are offered by way of sending data packets over conventional circuit switched voice traffic channels. However, circuit switching data packets is inefficient, unreliable, and expensive. Other systems such as Cellular Data Packet Data (CDPD) operate on existing analog and digital cellular networks. However, CDPD is expensive to apply to a cellular network. CDPD has an overly complicated protocol, and end user equipment is expensive. Moreover, CDPD is not designed to handle short messaging very well, as such systems are specifically designed for the purpose of transmitting and receiving large data files from computer to computer and other internet related operations.

There is a clear need for an efficient, accurate, robust and low-cost means and method for providing two-way data packet messaging for all cellular mobile radio systems and personal communication systems (PCS) that exist in the world today. The present inventor's two-way data packet messaging system is designed to provide a

viable platform for implementing a wide spectrum of value-added bearer services for existing cellular mobile radio, personal communication systems (PCS), and global systems for mobile (GSM).

Disclosure of Invention

Accordingly, it is an object of the present invention to provide the means and methodology of using and applying improved data packet communications protocols and data communications apparatuses that are applicable to existing cellular mobile radio networks also known as personal communication systems (PCS) and global system for mobile (GSM) networks. It is another object of the present invention to provide specialized data protocols that will operate seamlessly without having to significantly modify existing cellular network infrastructure. Furthermore, the present invention dramatically reduces the direct cost of implementing a wide spectrum of value-added bearer services that heretofore forced wireless network operators to spend millions of dollars to implement inefficient data packet systems. The present invention provides for a pristine and elegantly simple solution for providing value-added bearer services that include but are not limited to synchronized, asynchronous, packet switched, packet assembler/dissembler access protocols that make possible; two-way data messaging, two-way paging, motor vehicle fleet tracking, motor vehicle anti-theft, personnel management and tracking, remote sensing technology, electronic confinement, traffic management, global positioning system (GPS) data communications, point-of-sales, wireless gambling, and numerous other applications. It is another object of the invention to provide new data protocols that seamlessly fit within the highly efficient, robust and high-speed existing access channel and control channel protocols without causing disruption to existing cellular wireless network voice, and data traffic operations, and normal control channel operation routines. Furthermore, the present invention does not significantly impact any host cellular system capacity. In fact, the present invention does not cause any switching capacity problems. It is a stand-alone virtual data communication network that does not need to utilize any part of the cellular switch. However, the present invention can be adapted and fully integrated with all cellular base transceiver stations (BTS), base site controllers (BSC) and mobile switching center (MSC) switching and processing schemes, with simple operations software patches that allow for recognition, processing and routing of control channel application data (CCAD) data packets. These special software patches are modifications that implement the present invention's means and methodology while at the same time maximizing system efficiency and minimizing any potential impact upon cellular system capacity. The present invention adds control channel application data words by tagging onto

cellular system access protocols contained within multi-word data packets that transport user information within registration protocols, origination protocols, equipment registration protocols, home location register (HLR) access protocols, visitor location register (VLR) access protocols, and other system management and signaling protocols. These protocols are transmitted from application specific terminals and communicators to cellular system base transceiver stations (BTS), base site controllers (BSC), mobile switching centers (MSC) and subsequently relayed and routed to the public switch telephone networks (PSTN) and public land mobile networks (PLMN). CCAD data words are created and transmitted by the present invention's core application specific communicators and terminals for the purpose of sending global positioning system (GPS) correlative reference data bits, and other terminal or application specific device status bits to master central monitoring stations (MCMS) that process and relay said data words to individual application specific service bearers and service facilitators.

The present invention also provides for full integration of application specific devices that are separate data gathering systems such as global positioning system receivers, motor vehicle anti-theft devices, fleet management devices, gambling terminals, personnel management devices, stationary remote sensing devices, stationary security systems, that are physically integrated to normal but modified cellular terminals or communicators. The present invention's communicators and terminals are specially designed to process, and send the status bits created by these separate but physically integrated devices within control channel and system access channel multi-word packet protocols. The present invention offers unique interface protocols that are programmed to provide a transparent integration of device status bits within control channel and access channel bit fields that are normally used by cellular terminals for host cellular system access, registration, origination and other related control channel and access channel processes. In fact the present invention's application specific status bit fields are sent simultaneously with control channel and access channel information bits, and are virtually transparent to the host cellular system. However these status bits can contain all sorts of additional information, such as motor vehicle and personnel; position, velocity, direction, emergency status, home arrest status bits, security system status bits, environmental monitoring sensor status bits, betting information, and many other related application specific status bits.

Accordingly it is a further object of the present invention to provide the means and method of reading and processing these special application specific data words at the cellular system base transceiver station (BTS) base site controller (BSC), and mobile switching center (MSC) without further taxing host cellular air-interface system and

switch resource capacity. These special application specific data words are received, scanned, recognized and recorded at the base transceiver station (BTS), base site controller (BSC), and mobile switching center (MSC), and then routed to central monitoring, and to facilitator and service bearer service centers for direct interaction with the end user via the PSTN and PLMN networks.

Furthermore, the present invention provides for full duplex communications by integrating paging receivers, cell broadcast receivers, forward control channel receivers, digital traffic channel receivers and satellite receivers to the above mentioned application specific communicator. Special instruction or command messages are sent from the Master Central Monitoring Station (MCMS) by electronic and man-machine interface terminals via the PSTN/PLMN network to designated paging network controllers, cellular network switching centers and satellite network controllers. Once received, these command messages are processed and subsequently transmitted to one or many application specific terminals or communicators via paging, cellular, and cell broadcast base stations and other transmission towers. Once the application specific communicator receives the special command or instructional message, it is programmed to respond by processing and recognizing the significance of a particular command message and transmits the response over control channels and access channels in the heretofore mentioned manner.

Another important feature of the present invention is its ability to provide accurate accounting, in that each CCAD data packet is considered an individual transaction, therefore the customer is charged for only the CCAD data packet sent and processed. Currently, if a data message only takes ten seconds to transmit, the customer is still charged for a full minute of air time. This practice is expensive and unfair to the consumer.

Additional objects and advantages of the invention will be set forth in part in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The objects and advantages of the invention will be realized and attained by means of the elements and combinations particularly pointed out in the appended claims.

To achieve the foregoing objects, and in accordance with the purposes of the invention as embodied and broadly described herein, specialized data communications protocols and communications apparatuses are described which provide specialized application specific data communications for use with cellular mobile radio networks,

personal communication systems (PCS) networks, global system for mobile (GSM) and satellite system networks. The methodology described herein is integrated and operates within existing control channels, signaling channels, digital traffic channels, primary digital access channels, secondary digital access channels, fast associated control control channels (FACCH), authentication channels, slow associated control channels (SACCH), and all other control channel protocols that utilize FSK, TDMA, CDMA and other cellular network radio modulation platforms. Additional protocols and platforms which the present invention may also be applied to are specific in official documents called Interim Standards published by the Telephone Industry Association (TIA), and the European Telephone Standard (ETS).

Brief Description of the Drawings

The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate a preferred embodiment of the invention and, together with a general description given above and the detailed description of the preferred embodiments given below, serve to explain the principles of the invention.

Fig. 1, is a block diagram of a preferred wireless communications method showing the functional components of the control channel application data communication system, according to the invention.

Fig. 2, is a logic flow diagram of the wireless communication method, according to the invention.

Fig. 3, is a control channel application data word block diagram contained within an autonomous registration data packet, according to the invention.

Fig. 4, shows a logic flow chart of the data packet processing routine, according to the invention.

Fig. 5, is a block diagram of four access and control channel protocols used by the invention, according to the invention.

Best Mode for Carrying Out the Invention

Reference will now be made in detail to the present preferred embodiments of the invention as illustrated in the accompanying drawings. In describing the preferred embodiments and applications of the present invention, specific terminology is employed for the sake of clarity. However, the invention is not intended to be limited to

the specific terminology so selected, and it is understood that each specific element includes all technical equivalents which operate in a similar manner to accomplish a similar purpose.

In accordance with the present invention, there is provided a wireless communication method, comprising: adding control channel application specific data words to a wireless network by tagging said application specific data words onto cellular access protocols contained within a plurality of multi-word data packets which transport user information within a selected protocol within said wireless network; transmitting said control channel application specific data words from an application specific terminal and communicator to a transceiver means, to a controller means, and to switching means; and, relaying and routing said control channel application specific data words to an existing communication network.

There is also provided a wireless two-way data packet messaging method, comprising: adding control channel application data words to an existing wireless communication system by tagging said control channel application data words onto access protocols contained within a plurality of multi-word data packets which transport user information within a selected protocol within said wireless communications system; transmitting said control channel application data words from an application specific terminal and communicator to a transceiver means, to a controller means, and to a mobile switching means; and, relaying and routing said control channel application data words to an existing communication network.

The present invention also provides a wireless communications method, comprising: transmitting application specific status data bits simultaneously with control channel and access channel data bits within a wireless communications system; and, combining additional data bits to said status data bits for conveying application specific data.

Referring to Fig. 1, the method and apparatus of the present invention are shown comprising a Control Channel Application Data (CCAD) communication system including a communications terminal 100, a plurality of base transceiver sites (BTS) 101, and base site controllers (BSC) 224. Also illustrated are a mobile switching center (MSC) 104, an application specific data word packet processor 115, which is preferably located at each base transceiver site (BTS) 101 and each mobile switching center (MSC) 116, a public switched telephone network (PSTN) 110, T1 carrier 105, a landline telephone 113, and a master central monitoring station (MCMS) 106. Regional

processing center, facilitator bearer service providers (FAC) 120, and global positioning Navstar satellites (GPS) 112 and Inmarsat P satellites 114 are also shown. Cell broadcast transmitters 226, specialized control and access channel receivers 227, paging network controllers (PNCC) 221, and satellite system network controllers 109 are operably linked to the system.

Preferably each base transceiver site (BTS) 101 and base site controller (BSC) 224 are identical to one another, or represent base transceiver sites (BTS) 101 that operate as an integral part of any cellular mobile radio network, regardless of what standard it is configured to be compatible with, be it AMPS cellular, TACS cellular, ETACS cellular, NMT cellular, TDMA cellular, CDMA cellular, and/or a global system for mobile (GSM) cellular network system. The present invention operates in essentially the same methodology regardless of what protocol and modulation format the control channels, access channels and overhead signaling channels are configured for, be it digital or analog. Furthermore, the base transceiver sites (BTS), base site controller (BSC), mobile switching centers (MSC), the PSTN and T1/E1 spans are, preferably, part of an existing cellular communication system which operates over a designated cellular communications band.

The MCMS 106 and FAC 120 which are CCAD system installations preferably comprise one or more computer terminals for processing data word packets, sending command instructions to the end user, and maintaining records. The MCMS and FAC also contain standard telephone lines, GPS topography software and readout displays, multiplexing switches, PSTN lines, T1/E1 lines, and other standard central monitoring and service center equipment well known in the art. As will be explained in more detail below, the BTS, BSC, MCMS and FAC process all receive CCAD data word packets and send all command and instruction data words by unique software programs contained within the processors and terminals located at these CCAD system installations.

In Fig. 2 a block diagram of a CCAD mullet-word packet 103 is shown and how it is preferably sent and processed at the BTS and MSC. This CCAD packet 103 is configured for the FSK analog modulated reverse control channel (RECC) that is typically utilized in such cellular radio system access protocols. For example, this CCAD data packet utilizes a 48-bit word called the H word 140, that contains 36 information bits and 12 parity bits and is specifically designed to contain and carry application specific data bits such as GPS correlation location position bits and other status bit information. The RECC protocol allows for up to eight words to be sent in

one RECC multi-word data packet. This same RECC data packet is an autonomous registration packet with a total of five attached H words. Most applications will typically require no more than two H words to be transmitted along with the other three autonomous registration information words, however, certain CCAD applications will require only one H word to be used, and others will require up to five H words. Some digital access and control protocols allow for an unlimited number of application specific data packets to be attached to registration packets, origination packets, and other signaling packets. In still other cellular radio digital systems, application data packets can be sent independent of all other access protocol routines, as long as a designated cellular control channel and access channel operations standard are modified to allow for separate and independent application specific data word packets to be transmitted, received, recognized and processed by the host cellular network. However, for purpose of describing the means and methodology of the present invention, the FSK RECC 48-bit multi-word packet will be the focus of this disclosure, for all control channel and access channel protocols operate similarly, regardless of the modulation scheme; be it digital or analog, data throughput rate, or designated operating frequency.

Referring to Fig. 3, a block diagram of an FSK RECC 48-bit autonomous registration data packet with one H word attached is shown, and depicts the three words of this basic autonomous registration packet, and illustrates the significance of each information bit.

Seen also in Fig. 1, the CCAD communications terminal 100 is preferably configured to operate within the parameters of AMPS, NAMPS, DAMPS, TACS and ETACS cellular standards. The CCAD communications terminal 100 transmits a CCAD data packet 103 that is configured as an autonomous registration data packet. The CCAD packet is received by the BTS 101, via an individual sector antenna 122, which is directly attached to a control channel sector receiver 227, that converts air interface protocol to RS232 electrical protocol. The BSC 224 contains a special processor 115 that scans all control channel or access channel data packets and detects all CCAD data packets. The present invention provides for a separate sector receiver 227 that is attached in tandem along with a standard control channel BTS receiver. Furthermore, this stand-alone receiver 227 is directly attached to a separate and distinct CCAD data packet processor 115 that operates completely independent from the BSC processor 224. In this way the present invention can operate and act independently from normal control channel data processing routines. However, the present invention can operate seamlessly without the need to add separate BTS and BSC hardware and software. Standard BSC software can be modified to recognize and process CCAD data packets

by simply utilizing a software patch to existing BSC processor software to detect and route CCAD data packets to the MSC 104 via T1/DSO pathways 105, that are provided by the PSTN 110. This enables the host cellular network to utilize the present invention's means and methodology without having to add one bit of BSC and BTS hardware. Furthermore, MSC 104 switch software can be programmed to receive and recognize CCAD data packets and automatically route said packets to the MCMS 106 via T1/DSO routinely used by the PSTN 110. In fact, the entire CCAD application specific data messaging system can be implemented and integrated with any cellular network and its operations standard with software patch modifications to any and all BTS, BSC and MSCs without any need of adding separate hardware. However, certain cellular network operators may choose to implement CCAD technology without the necessity of modifying BSC, BTS and MSC operations software, yet still wanting the benefits of the technology. Therefore the present invention provides a CCAD network overlay system, that in fact creates a separate and distinct CCAD virtual network which operates in tandem but transparently to the host cellular network. Essentially the present invention's separate hardware and software virtual network approach operates exactly the same way as a CCAD BSC, BTS and MSC software-only modification solution, the only difference to the software-only solution is the addition and integration of radio receivers, separate time division (TDM) multiplexers, data processors and routers in conjunction with BTS, BSC and MSC hardware and software.

Referring to Fig. 2, the CCAD data packet 103 is transmitted from the CCAD communications terminal 100, sector antenna 122 receives the data packet. A special CCAD sector receiver 227 receives the CCAD data packet 103, along with all other control channel and access channel data. The sector receiver converts the air interface modulated protocol that contains the CCAD data packet 103 to RS 232 data protocol and routes the data packet to the CCAD BSC multiplexer 117, the multiplexer receives the data packet and routes the packet to the CCAD main BSC processor 115. The processor scans and detects only CCAD control channel and access channel data and ignores all other non CCAD data packets. Preferably, the processor passively scans and detects CCAD data packets without causing disruption to any and all other control channel and access channel operations. Additionally, the cellular network that is configured with CCAD hardware and software ignores the H word and only recognizes the first three words of this autonomous registration packet. The H word is only relevant if the BSC, BTS and MSC software is modified and configured to recognize the H word or any other CCAD application specific data word. Otherwise the CCAD hardware and software virtual system operates totally separate to the host cellular network. Once the

CCAD data packet is scanned and detected, it is then routed to the D4 channel bank 121 and a designated D4 channel bank card 118. The D4 channel bank card converts processor RS232 protocol into T1/DSO protocol 105 and routes the CCAD data packet via the PSTN 110 to the MSC 104, whereby the CCAD MSC processor receives the data packet, processes, converts, and routes it to the MCMS 106 via the PSTN 110 for processing.

As further shown in Fig. 2, the multiplexer 117 can handle up to three separate sector receivers. For example, depicted here are three CCAD communications terminals 100 that transmit three separate CCAD data packets, the multiplexer receives each one, at slightly different time increments. Depending upon which of the three packets arrives at the multiplexer first, from the three sectors antennas and receivers, the packet is then sent to the processor 115 on a first come first serve basis. The multiplexer is synchronized to the cellular control channel access channel synchronization clock to maintain timing accuracy and uniformity. Sector antennas (a) 122, (b) 123, and (c) 124, can fully load the sector receivers (a) 227, (b) 228 and (c) 229, with data packets and the CCAD multiplexer will process all incoming data packets at full network traffic load without loss of system efficiency or cause for overall system breakdown.

In Fig. 3, a block diagram is shown that depicts the CCAD multi-word data packet in the FSK RECC protocol. The A-word 125 contains 36 information bits, however for CCAD data packet purposes the only bit fields pertinent are the mobile identification number (MIN) 128, the number of additional words coming (NAWC) field 129, and the station class mark (SCM) 130 bit fields. The MIN number is the ten-digit directory number assigned to all mobile terminals. All mobile terminals, including CCAD communications terminals are assigned an MIN number. The MIN number uniquely identifies the CCAD communications terminal as belonging to a paying cellular system user that is assigned to a specific cellular carrier which operates in a designated geographic area. The primary MIN number is made up of seven digits, as depicted in the A word 125. CCAD communications terminals also have normal cellular terminal voice capabilities like all other cellular communicators, and the MIN number provides full duplex to the PSTN network and the assigned cellular terminal. The B-word 126, contains the three-digit area code 133 of the full MIN number. Additional information contained in the B-word is the order qualifier code 134 and the order code 135. These two code fields instruct the BSC to perform various tasks. This particular order code ì01101î tells the BSC that this data packet is an autonomous registration, therefore no voice or traffic channel is requested. Since the RECC FSK protocol allows up to eight words in one data packet, therefore utilizing five words for an autonomous registration

data packet is completely acceptable. The A-word 124 contains an NAWC 129 field, in fact all RECC FSK words contain an NAWC field. This field instructs the BSC to expect a designated number of words to be counted and received in this particular data packet. The A-word 125 NAWC field 129 tells the BSC to expect four additional words to follow the first word received. In fact each word indicates in its own NAWC field to expect so many additional words to follow. In this way adding two or more H-words to an autonomous registration data packet works, thus transforming it into an application specific data packet. This methodology is entirely acceptable to the protocol standards, while at the same time utilizing this control channel and access channel data packet in an entirely new and innovative way.

As further shown in Fig. 3, the C-word is utilized principally as the electronic serial number (ESN) 136 word. Each CCAD communications terminal has its own electronic serial number. This number contains information that identifies the manufacturer of the terminal, and other pertinent information. The cellular provider uses the ESN to also identify the user, for authentication and account verification.

The present invention utilizes the ESN 136, SCM 137 and the MIN 128 as indicators for the aforementioned scanning, recognition and identification process that takes place at the BTS, BSC and MSC. These designated bit fields are also utilized to maintain an accurate transaction count when each CCAD data packet passes through the BTS, BSC, MSC, and MCMS. The facilitator and end user is charged for each CCAD data packet sent from the CCAD communications terminal and no more. H[1] word 131, and H[2] word 132 are shown here to illustrate how each data field is utilized. For example in H[1] dig1 and dig2 fields 138 are used to identify each application to the MCMS. Dig1 indicates a 0 and dig2 indicates a 2, that tells the MCMS that this particular CCAD communications terminal is designed for fleet tracking and is equipped with a GPS receiver. Dig 3, dig4, and dig 5, 139 indicates a 180-degree longitude location. Dig 6, dig7 and dig 8, 140 indicate more detailed longitude degree information 359.

The H[2] word 132 preferably also contains GPS information and other related status information. For example, dig1, dig2, dig3, and dig4, 141 indicate 36.30 degrees latitude. Dig5 and dig 6, 142 indicate a 1 and 2, the MCMS recognizes from these numbers that the motor vehicle this CCAD communications terminal is installed in, is traveling northwest, since the 1 indicates north and the 2 indicates west. Dig7 and dig 8, 143 indicate other status bits. These two fields can be used to signify a motor vehicle anti-theft alarm status, or emissions status. The present invention's GPS fields can also

be used to indicate any GPS application specific apparatus status for personnel management when a person is on foot, or traveling in a motor vehicle. This same approach can be used for home arrest criminal tracking, employee tracking, medical patient tracking, police officer tracking, child protection and other such applications. The applications of such method are truly numerous and varied.

In Fig. 4, a logic flow diagram of the CCAD data packet is shown being processed at the BTS, BSC, MSC and MCMS. The CCAD communications terminal 100 transmits a CCAD data packet 103. INPUT 144 represents the BTS and BSC, once received the CCAD data packet and all other data packets are multiplexed 145, scanned and either rejected at No 147 and data tossed via Exit 148, or identified by electronically detecting the unique CCAD ESN, SCM and in some instances a special CCAD MIN contained within the data packet, and accepted as Yes 149. The processor preferably then creates a statistic 150, counts the transaction 151, records the transaction 152, appends the statistical record to the processed CCAD data packet 153, converts the CCAD data packet to T1/DSO 154, and sends processed CCAD data packet to the MCMS 106 via the PSTN exit 155. Once the CCAD data packet 103 is graphically expressed in directed arrows from the terminal 100 to the input 114, the packet is also expressed as a block description CCAD P 103. The CCAD packet 103 arrives at the MCMS, the data packet with appended statistics are examined, recorded, processed and various status determinations are made. If the CCAD data packet contains GPS and other pertinent information that signifies to the MCMS, a particular need to (a) update a CCAD user's location, (b) send an alpha numeric message to cause the user to perform some manual function, and/or (c) send data command messages that cause the CCAD communications terminal to automatically respond to the command by transmitting new CCAD data packets in the aforementioned manner, then the MCMS sends a command and instruction message. The CCAD user can be instructed to hold his communications terminal in such a way as to allow the GPS antenna to have a clear line of sight to the GPS Navstar satellites orbiting the Earth. The GPS antenna is located in the flipout portion of the terminal that typically acts as a microphone container, and allows the user to simply hold the terminal until it receives GPS location correlations, and tells the user by audio tonal beeping that a new position has been achieved.

As further shown in Fig. 4, the CCAD communications terminal can receive commands, alpha numeric instructions, and other alpha numeric messages from various communications mediums. The CCAD communications terminal can be equipped with a paging receiver, a satellite receiver, a cell broadcast receiver, or the terminal can receive the aforementioned messaging from the host cellular system's forward control channels,

paging channels, overhead channels, and digital traffic and control channels. The MCMS 106 can send instructions and command messages from a paging network 156, or chosen satellite network such as Inmarsat P 157, or by GSM cell broadcast point to omni-point system 108.

Referring to Fig. 5, the present invention can utilize any control channel, access channel and signaling channel protocol. For example, a CCAD data packet can be tagged onto or integrated with an RECC FSK autonomous registration packet 107 with a contained H word 140, an IS-54/IS-136 DAMPS TDMA access channel and control channel data packet, with the application data H word contained in the FACCH field 160 and the user data field. Additionally, the CCAD data packet H word can be contained with an IS-95 narrowband spread spectrum control channel and access channel data field 159. The H word can be made up of a 172-bit CDMA field 161, a 122-bit TDMA user data field 164, and the FACCH field 160, contained within the same data frame. The H word can also be made up of 184 FACCH GSM message bits 163 contained within a standard GSM access channel and control channel TDMA word block 165. All of these protocols utilize training sequence bits, tail release bits, and are quite similar to one another. The only marked differences between each protocol illustrated here are the modulation, data burst schemes, data rates and synchronization routines that are used. The method of the present invention and the means disclosed herein for the CCAD data packet for each protocol is essentially the same. The methodology and means for scanning, recognition, and processing CCAD data packets at the BTS, BSC, MSC and MCMS is essentially the same for each protocol and operations standard listed here, regardless of the modulation scheme, data rate, and overall operations standard. Whether a software-only solution, or a hardware and software solution, the present invention's means and methodology can be applied to any and all cellular system control channel, access channel and short messaging formats.

Additional advantages and modifications will readily occur to those skilled in the art. Therefore, the invention in its broader aspects is not limited to the specific details, representative devices, and illustrative examples shown and described. Accordingly, departures may be made from such details without departing from the spirit or scope of the general inventive concept as defined by the appended claims and their equivalents.

Claims

1. A wireless communication method, comprising:

adding control channel application specific data words to a wireless network by tagging said control channel application specific data words onto cellular access protocols contained within a plurality of multi-word data packets which transport user information within a selected protocol within said wireless network;

transmitting said control channel application specific data words from an application specific terminal and communicator to a transceiver means, to a controller means, and to switching means; and

relaying and routing said control channel application specific data words to an existing communication network.

2. The method of claim 1, wherein said control channel application specific data words are created and transmitted by an application specific communicator for sending global positioning system correlative reference data bits to a central monitoring station.

3. The method of claim 1, wherein said control channel application specific data words are created and transmitted by an application specific communicator for sending application specific device status bits to a central monitoring station.

4. The method of claim 1, wherein said selected protocol comprises a registration protocol.

5. The method of claim 1, wherein said selected protocol comprises an organization protocol.

6. The method of claim 1, wherein said selected protocol comprises an equipment registration protocol.

7. The method of claim 1, wherein said selected protocol comprises a home location register access protocol.

8. The method of claim 1, wherein said selected protocol comprises a system management and signaling protocol.

9. A wireless two-way data packet messaging method, comprising:

adding control channel application data words to an existing wireless communications system by tagging said control channel application data words onto access protocols contained within a plurality of multi-word data packets which transport user information within a selected protocol within said wireless communication system;

transmitting said control channel application data words from an application specific terminal and communicator to a transceiver means, to a controller means, and to a mobile switching means;

relaying and routing said control channel application data words to an existing communication network.

10. The method of claim 9; wherein said control channel application specific communicator for sending global positioning system correlative reference data bits to a central monitoring station.

11. The method of claim 9; wherein said control channel application specific data words are created and transmitted by an application specific communicator for sending application specific device status bits to a central monitoring station.

12. The method of claim 9, wherein said selected protocol comprises a registration protocol.

13. The method of claim 9, wherein said selected protocol comprises an organization protocol.

14. The method of claim 9, wherein said selected protocol comprises an equipment registration protocol.

15. The method of claim 9, wherein said selected protocol comprises a home location register access protocol.

16. The method of claim 9, wherein said selected protocol comprises a system management and signaling protocol.

17. A wireless communications method, comprising:

transmitting application specific status data bits simultaneously with control channel and access channel data bits within a wireless communications system; and

combining additional data bits to said status data bits for conveying application specific data.

18. The method of claim 17, wherein said application specific status data bits are derived from a global positioning system receiver.

19. The method of claim 17, wherein said application specific status data bits are derived from a motor vehicle anti-theft device.

20. The method of claim 17, wherein said application specific status data bits are derived from a fleet management device.

21. The method of claim 17, wherein said application specific status data bits are derived from a gambling terminal.

22. The method of claim 17, wherein said application specific status data bits are derived from a stationary remote sensing device.

23. The method of claim 17, wherein said application specific status data bits are derived from a stationary security system.

24. The method of claim 17, wherein said application specific status data bits are derived from a remote measuring device.

25. The method of claim 17, wherein said application specific status data bits are derived from a global positioning data system.

26. The method of claim 17, wherein said application specific status data bits are integrated within control channel and system access channel multi-word packet protocols.

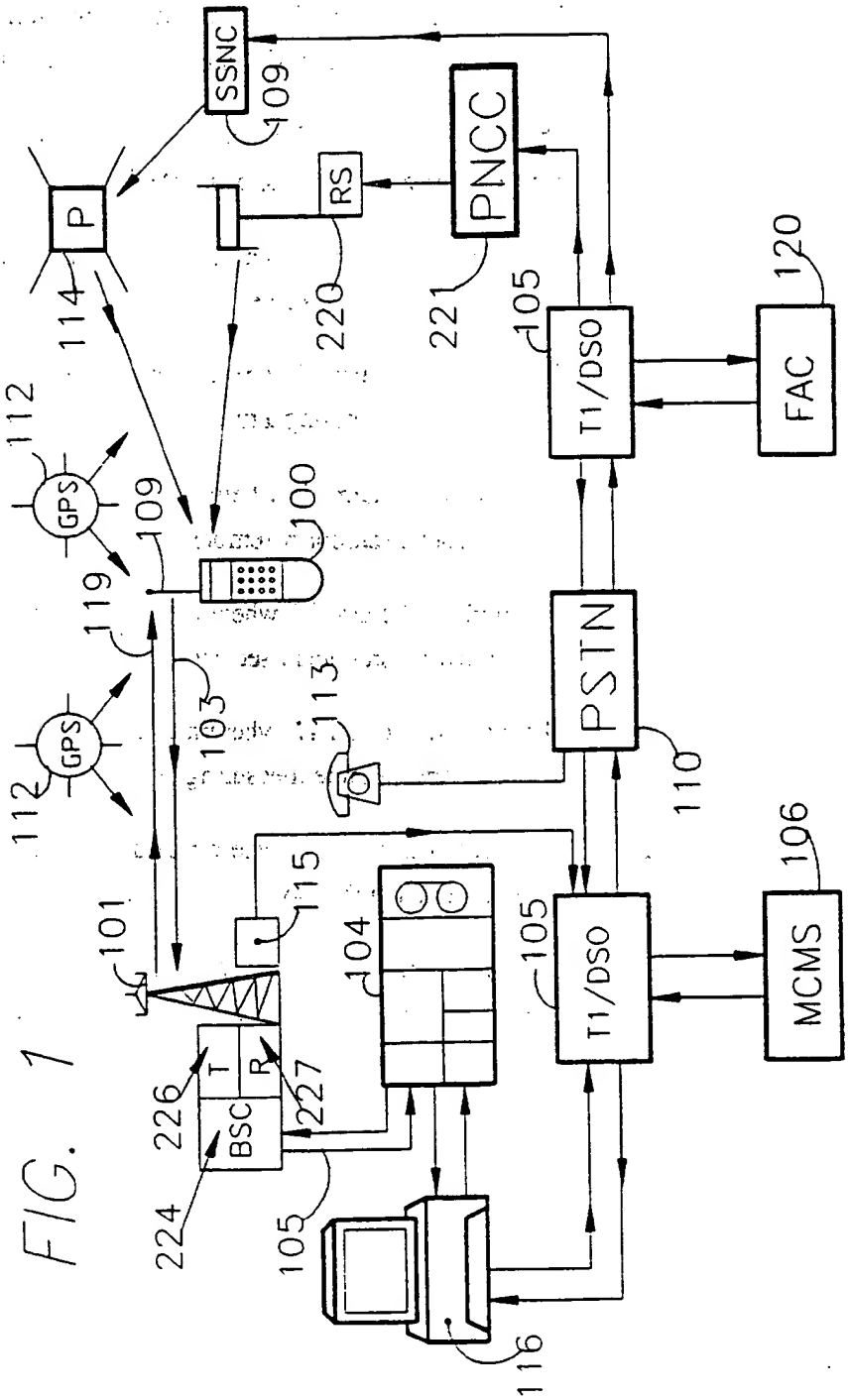
SSNC
109
PNCC
RS
P
114
220
221
105
T1/DS0
120
FAC
112
GPS
109
100
119
103
113
PSTN
110
GPS
112
115
104
105
T1/DS0
106
MCMS
101
T
R
226
227
BSC
224
105
116

FIG. 1

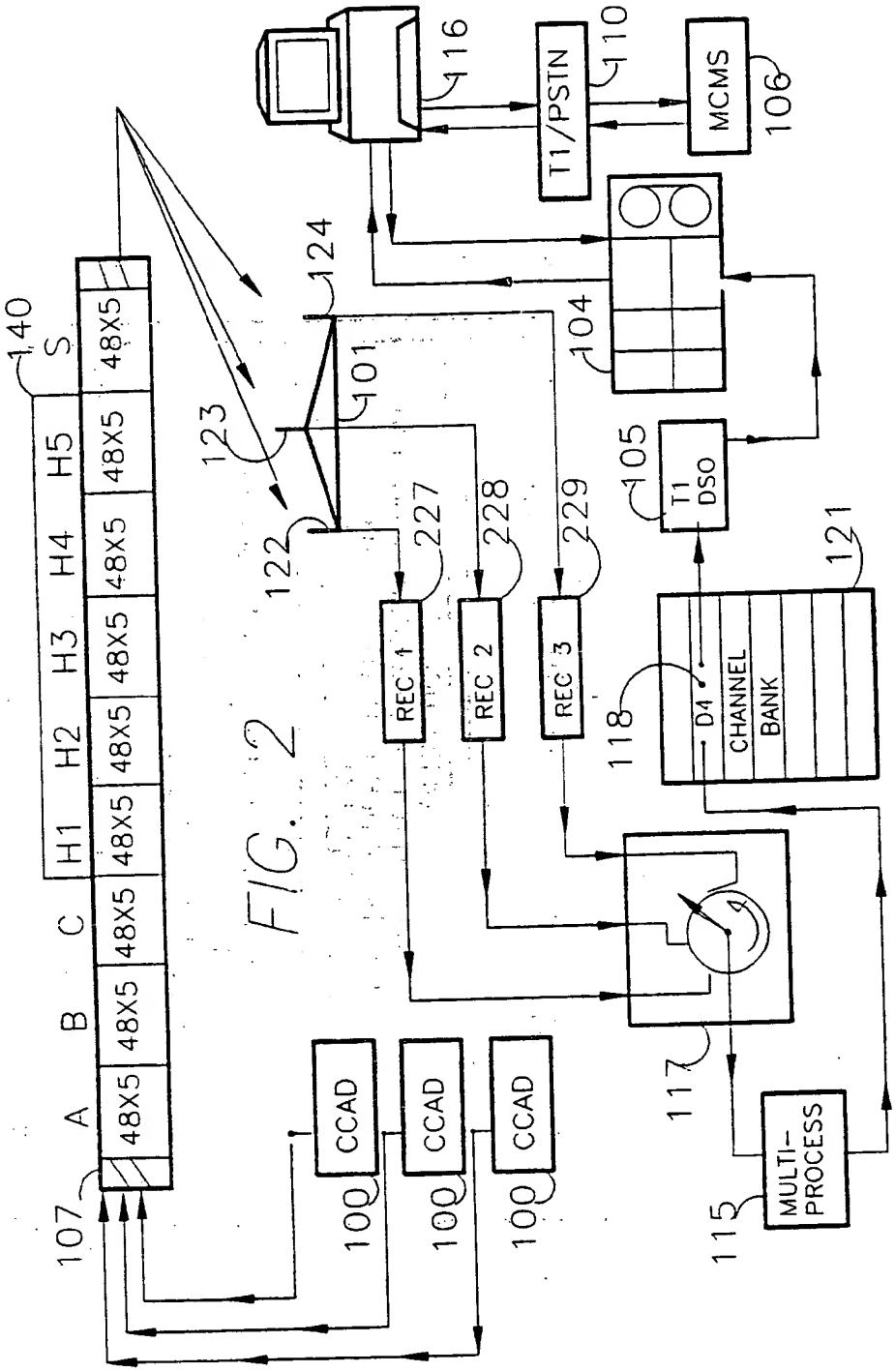
140
S
H5
H4
H3
H2
H1
C
B
A
48X5
107
100
CCAD
123
124
101
122
227
228
229
REC 1
REC 2
REC 3
116
T1/PSTN
110
MCMS
106
104
105
T1 DSO
121
D4 CHANNEL BANK
118
117
MULTI-PROCESS
115

FIG. 2

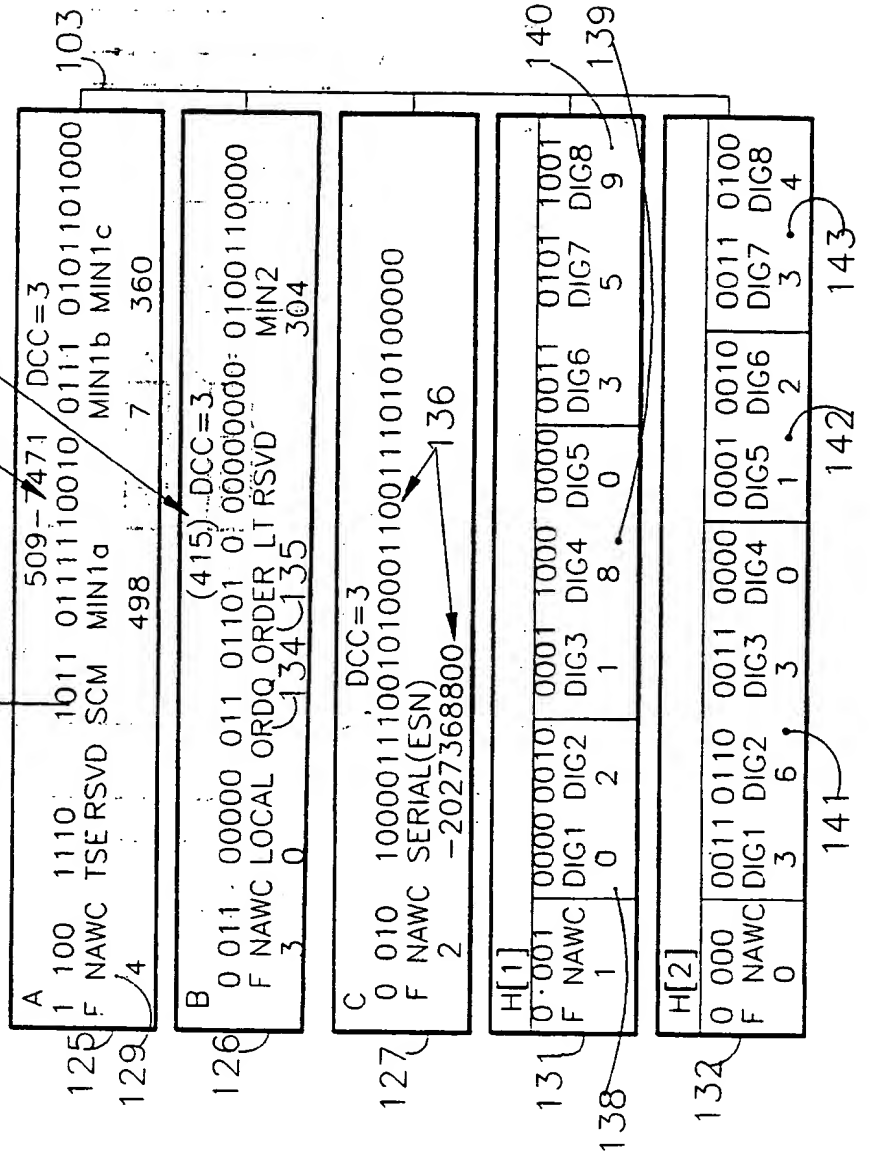
FIG. 3
103
140
139
137
128
133
509
471
DCC=3
A
1 100 1110 1011 0111 1001 0 0111 0101 1010 1000
F NAWC TSE RSVD SCM MIN1a MIN1b MIN1c
4 498 7 360
125
129
(415)
DCC=3
B
0 011 00000 011 0110 1 0 0000 0000 0 0100 1100 0000
F NAWC LOCAL ORDQ ORDER LT RSVD MIN2
3 0 304
134
135
126
DCC=3
C
0 010 1000 0111 1001 0100 0110 0111 0101 0100 0000
F NAWC SERIAL(ESN)
2 -2027368800
136
127
H[1]
0 001 0000 0010 0001 1000 0000 0011 0101 1001
F NAWC DIG1 DIG2 DIG3 DIG4 DIG5 DIG6 DIG7 DIG8
1 0 2 1 8 0 3 5 9
131
138
H[2]
0 000 0011 0110 0011 0000 0001 0010 0011 0100
F NAWC DIG1 DIG2 DIG3 DIG4 DIG5 DIG6 DIG7 DIG8
0 3 6 3 0 1 2 3 4
132
141
142
143

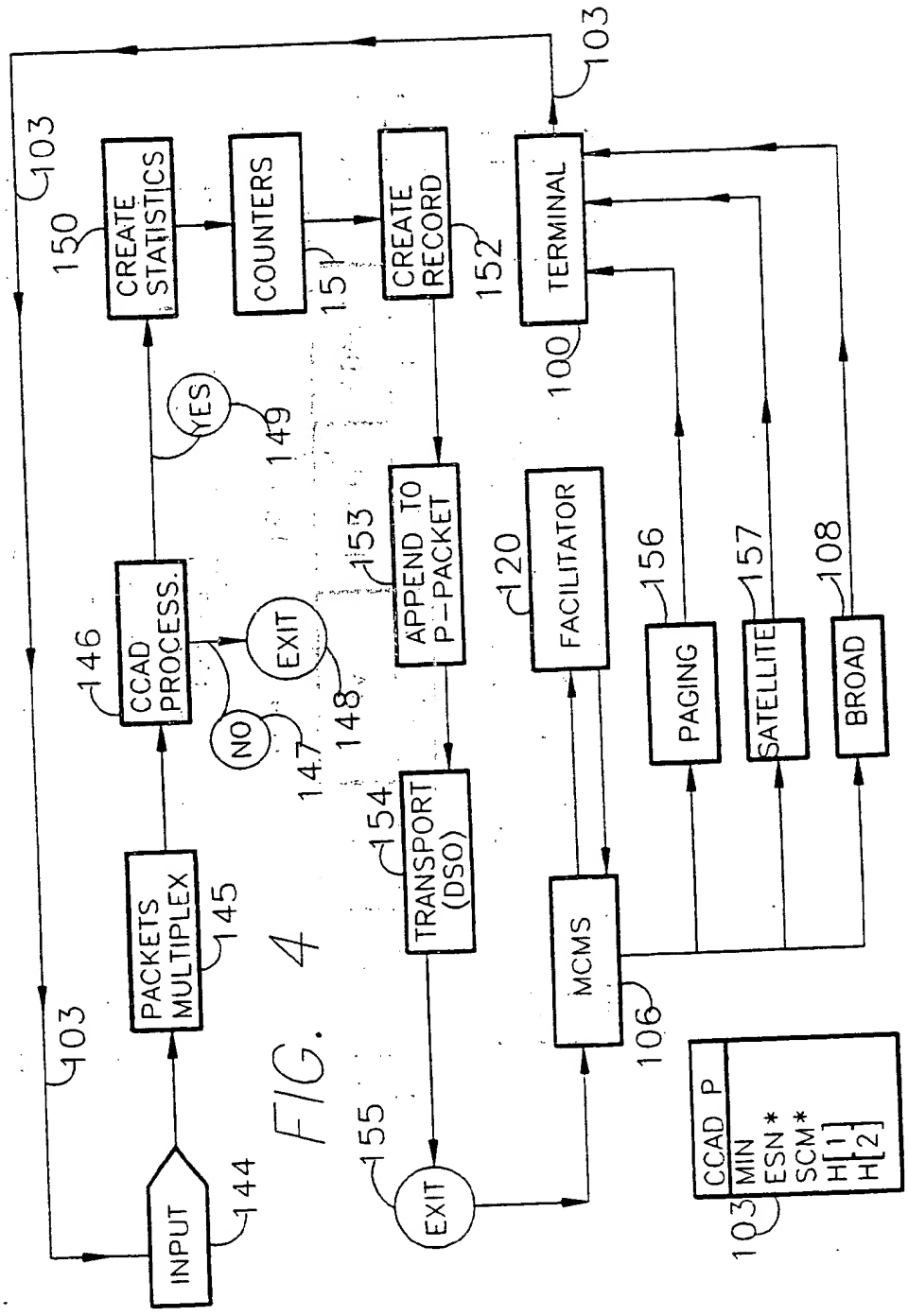
INPUT
144
PACKETS MULTIPLEX
145
CCAD PROCESS.
146
EXIT
148
NO
147
YES
149
CREATE STATISTICS
150
COUNTERS
151
CREATE RECORD
152
APPEND TO P-PACKET
153
TRANSPORT (DSO)
154
EXIT
155
TERMINAL
100
FACILITATOR
120
MCMS
106
PAGING
156
SATELLITE
157
BROAD
108
CCAD P
MIN
ESN*
SCM*
H[1]
H[2]
103
103
103
403

FIG. 4

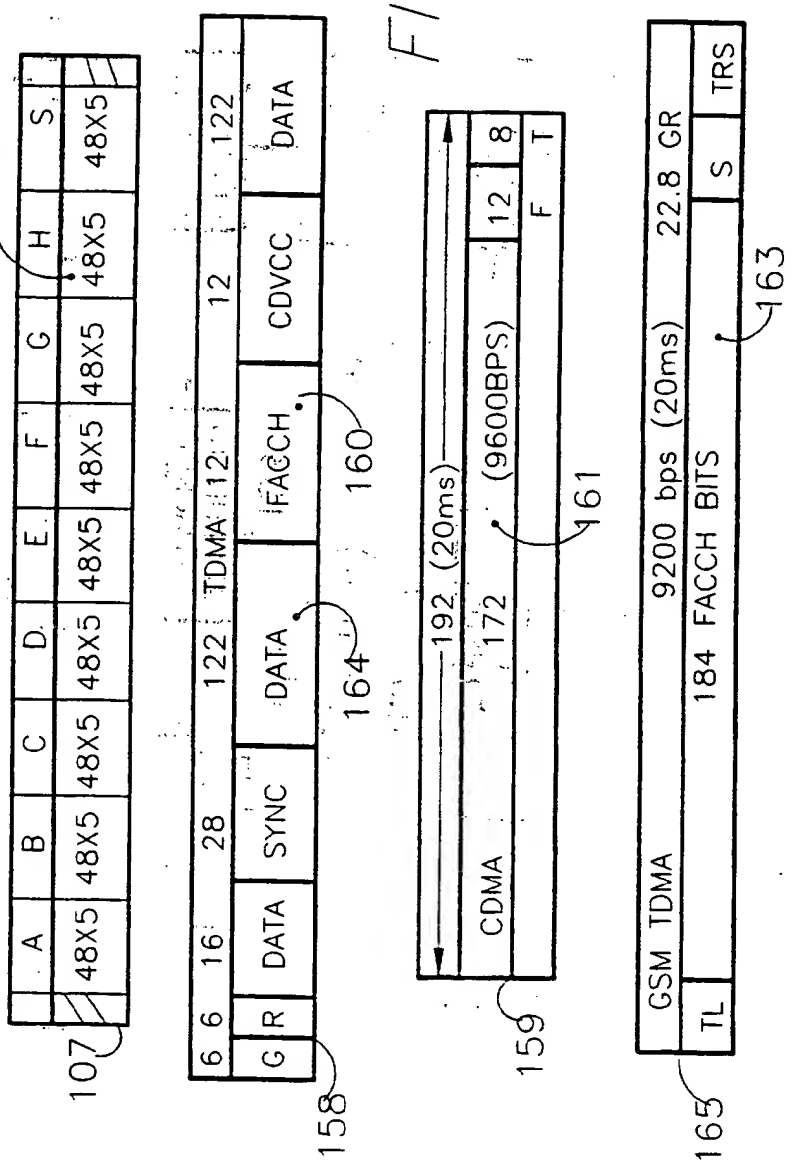
140
A
B
C
D
E
F
G
H
S
48X5
107
6 6 16 28 122 TDMA 12 12 122
G R DATA SYNC DATA FACCH CDVCC DATA
158
164
160
192 (20ms)
CDMA 172 (9600BPS) 12 8
F T
159
161
GSM TDMA 9200 bps (20ms) 22.8 GR
TL 184 FACCH BITS S TRS
165
163

FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US95/09887

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :H04M 11/00
US CL : 455/33.1, 379/59
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 455/33.1, 54.1, 68; 379/59, 63; 370/94.1, 95.3, 110.1

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

none

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

INSPEC database

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US, A, 5,410,737 (Jones) 25 April 1995 see column 1-2	1-26
A	IEEE Communications Magazine, April 1993, Sarnecki, J., Microcell Design Principles", pp.76-82	1-26
A	IEE Colloquium on Vehicle Location and Fleet Management, 6/8/93, Stewart, J., "Vehicle Location and Position Monitoring System Using Satellite Navigation and Cellular Telephone", pp. 7/1-5	1-26

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be part of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search
01 OCTOBER 1995

Date of mailing of the international search report
30 NOV 1995

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